What is Claimed is:

1. A semiconductor laser comprising:

a first cladding layer;

an active layer;

a second cladding layer; and

a current constriction means for defining a current injection region in said active layer;

wherein said active layer has a gain region which acquires an optical gain by current injection thereto; a saturable absorption region in which current injection thereto little occurs and light effusion thereto occurs; and an outside region, being in contact with said saturable absorption region, in which current injection thereto little occurs and light effusion thereto little occurs; and

an effective band gap of said saturable absorption region is larger than that of said outside region.

2. A semiconductor laser comprising:

a first cladding layer;

an active layer;

a second cladding layer; and

a current constriction means for defining a current injection region in said active layer;

wherein said active layer has a gain region which

acquires an optical gain by current injection; and

a saturable absorption layer is provided in at least one of said first and second cladding layers, said saturable absorption layer having a saturable absorption region which has an effective band gap nearly equal to or narrower than that of said active layer and in which light effusion thereto occurs, and an outside region, being in contact with said saturable absorption region, which has an effective band gap smaller than that of said saturable absorption region and in which light effusion thereto little occurs.

3. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a double hetero structure; and

an effective band gap of said saturable absorption region is larger than that of said outside region.

4. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a double hetero structure; and

an effective band gap of said saturable absorption region is larger than that of said outside region.

5. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a single or multiple quantum well

structure; and

an effective band gap of a quantum well layer in said saturable absorption region is larger than that of an quantum well layer in said outside region.

6. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a single or multiple quantum well structure; and

an effective band gap of a quantum well layer in said saturable absorption region is larger than that of an quantum well layer in said outside region.

7. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a single or multiple quantum well structure; and

a thickness of a quantum well layer in said saturable absorption region is smaller than that of an quantum well layer in said outside region.

8. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a single or multiple quantum well structure; and

a thickness of a quantum well layer in said saturable absorption region is smaller than that of an

quantum well layer in said outside region.

9. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a multiple quantum well structure; and

a thickness of each quantum well barrier layer between two quantum well layers in said saturable absorption region is larger than that of each quantum well barrier layer between two quantum well layers in said outside region.

10. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a multiple quantum well structure; and

a thickness of each quantum well barrier layer between two quantum well layers in said saturable absorption region is larger than that of each quantum well barrier layer between two quantum well layers in said outside region.

11. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a multiple quantum well structure; and

the number of quantum well layers in said saturable absorption region is smaller than that of quantum well layers in said outside region.

12. A semiconductor laser according to claim 2,

wherein each of said saturable absorption region and said outside region has a multiple quantum well structure; and

the number of quantum well layers in said saturable absorption region is smaller than that of quantum well layers in said outside region.

13. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

a band gap of a quantum wire in said saturable absorption region is larger than that of a quantum wire in said outside region.

14. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

a band gap of a quantum wire in said saturable absorption region is larger than that of a quantum wire in said outside region.

15. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

a thickness of a quantum wire in said saturable absorption region is smaller than that of a quantum wire in said outside region.

16. A semiconductor laser according to claim 2,

wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

a thickness of a quantum wire in said saturable absorption region is smaller than that of a quantum wire in said outside region.

17. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

the number of quantum wires in said saturable absorption region is smaller than that of quantum wires in said outside region.

18. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

the number of quantum wires in said saturable absorption region is smaller than that of quantum wires in said outside region.

19. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

at least one of quantum wires is formed in such a manner as to cross from said saturable absorption region to said outside region.

20. A semiconductor laser according to claim 2,

wherein each of said saturable absorption region and said outside region has a quantum wire structure; and

at least one of quantum wires is formed in such a manner as to cross from said saturable absorption region to said outside region.

21. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

an average band gap of quantum dots in said saturable absorption region is larger than that of quantum dots in said outside region.

22. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

an average band gap of quantum dots in said saturable absorption region is larger than that of quantum dots in said outside region.

23. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

an average volume of quantum dots in said saturable

absorption region is smaller than that of quantum dots in said outside region.

24. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

an average volume of quantum dots in said saturable absorption region is smaller than that of quantum dots in said outside region.

25. A semiconductor laser according to claim 1, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

a number density of quantum dots in said saturable absorption region is smaller than that of quantum dots in said outside region.

26. A semiconductor laser according to claim 2, wherein each of said saturable absorption region and said outside region has a plurality of quantum dot structures; and

a number density of quantum dots in said saturable absorption region is smaller than that of quantum dots in said outside region.

27. A semiconductor laser according to claim 1,

wherein said outside region has a double hetero structure; and

said saturable absorption region has a quantum well structure, a quantum wire structure, or a quantum dot structure.

28. A semiconductor laser according to claim 2, wherein said outside region has a double hetero structure; and

said saturable absorption region has a quantum well structure, a quantum wire structure, or a quantum dot structure.

29. A semiconductor laser according to claim 1, wherein said outside region has a quantum well structure; and

said saturable absorption region has a quantum wire structure or a quantum dot structure.

30. A semiconductor laser according to claim 2, wherein said outside region has a quantum well structure; and

said saturable absorption region has a quantum wire structure or a quantum dot structure.

31. A semiconductor laser according to claim 1, wherein said outside region has a quantum wire structure; and

said saturable absorption region has a quantum dot structure.

32. A semiconductor laser according to claim 2, wherein said outside region has a quantum wire structure; and

said saturable absorption region has a quantum dot structure.

33. A method of producing a semiconductor laser, comprising:

a first growth step of sequentially growing, on a substrate, a first cladding layer, a first active layer for forming a gain region, and a second cladding layer, to form a stacked semiconductor layer;

a first groove formation step of forming stripe-like first grooves in part of said stacked semiconductor layer with a specific gap kept between the grooves, to form a stripe-like ridge between the grooves and to expose the first cladding layer from the bottoms of the first grooves;

a second growth step of growing a second active layer for forming a saturable absorption region on the first cladding layer exposed in the first grooves, the second active layer having a composition different from that of the first active layer, and growing a current

constriction layer for forming a current constriction means;

a second groove formation step of forming second grooves on both sides of the ridge with specific distances kept between the second grooves and the ridge, to expose the first cladding layer from the bottoms of the second grooves; and

a third growth step of growing a third active layer for forming an outside region on the first cladding layer exposed in the second grooves, the third active layer having a composition different from those of the first and second active layers for forming the gain region and the saturable absorption region, and growing a current constriction layer for forming the current constriction means;

wherein effective band gaps Eg_1, Eg_2 and Eg_3 of the gain region, saturable absorption region and outside region, respectively, are selected to satisfy an inequality of $Eg_1 \geqq Eg_2 > Eg_3$.

34. A method of producing a semiconductor laser, comprising:

a first growth step of sequentially growing, on a substrate, a first cladding layer, an active layer having an effective band gap which is uniform in a first

direction and which becomes smaller from the center to both sides of the active layer in a second direction perpendicular to the first direction, and a second cladding layer, to form a stacked semiconductor layer;

a groove formation step of forming stripe-like grooves spaced from each other at a specific gap in the stacked semiconductor layer in such a manner as to leave a portion, having a large effective band gap, of the active layer in a stripe between the grooves and to leave a portion, having a specific thickness, of the second cladding layer on the bottoms of the grooves; and

a second growth step of growing, in the grooves, a current constriction layer, which forms a current constriction means for defining a current injection region at the stripe portion, having the large effective band gap, of the active layer.

35. A method of producing a semiconductor laser, comprising:

a growth step of sequentially growing, on a substrate, a first cladding layer, an active layer having an effective band gap which is uniform in a first direction and which becomes smaller from the center to both sides of the active layer in a second direction perpendicular to the first direction, and a second

cladding layer, to form a stacked semiconductor layer; and

a current constriction layer formation step of implanting ions of an impurity in side portions, each having a small effective band gap, on both sides of a stripe portion, having a large effective band gap, of the active layer, to form a current constriction layer which forms a current constriction means for defining a current injection region at the stripe portion, having the large effective band gap, of the active layer.

36. A method of producing a semiconductor laser according to claim 34, further comprising:

a step of forming, on the substrate, stripe-like masks for selectively forming semiconductor films; and

a step of growing the stacked semiconductor layer after said mask formation step

37. A method of producing a semiconductor laser according to claim 35, further comprising:

a step of forming, on the substrate, stripe-like masks for selectively forming semiconductor films; and

a step of growing the stacked semiconductor layer after said mask formation step.

38. A method of producing a semiconductor laser according to claim 34, further comprising:

a step of disposing stripe-like masks for selectively forming semiconductor films on the substrate or at positions opposed to the substrate; and

a step of growing the stacked semiconductor layer through the masks.

39. A method of producing a semiconductor laser according to claim 35, further comprising:

a step of disposing stripe-like masks for selectively forming semiconductor films on the substrate or at positions opposed to the substrate; and

a step of growing the stacked semiconductor layer through the masks.

40. A method of producing a semiconductor laser, comprising:

a first growth step of growing, on a substrate, a first cladding layer, an active layer, a second cladding layer, and a saturable absorption layer which is positioned at least one of the first and second cladding layers and which forms a saturable absorption region, to form a stacked semiconductor layer;

a groove formation step of forming, in part of the stacked semiconductor layer, stripe-like grooves spaced from each other at a specific gap to a depth crossing the saturable absorption layer for forming a stripe-like

ridge; and

a second growth step of growing, in the grooves, a saturable absorption layer for forming a current constriction layer which forms, at least on both sides of the ridge, a current constriction means for defining a current injection region in the active layer, and for forming an outside region which is in contact with the saturable absorption layer and which has an effective band gap smaller than that of the saturable absorption layer.

41. A method of producing a semiconductor laser, comprising:

a first growth step of growing, on a substrate, a first cladding layer, an active layer, a second cladding layer, and a saturable absorption layer positioned in at least one of the first and second cladding layers and having an effective band gap which is uniform in a first direction and which becomes smaller from the center to both sides of the saturable absorption layer in a second direction perpendicular to the first direction, to form a stacked semiconductor layer;

a groove formation step of forming stripe-like grooves spaced from each other at a specific gap in the stacked semiconductor layer to such a depth as to leave a

portion, having a large effective band gap, of the saturable absorption layer in a stripe between the grooves and to leave part of the saturable absorption layer and a portion, having a specific thickness, of the second cladding layer, and

a second growth step of growing, in the grooves, a current constriction layer, which forms a current constriction means for defining a current injection region in the active layer, on both sides of the ridge.

42. A method of producing a semiconductor laser, comprising:

a growth step of growing, on a substrate, a first cladding layer, an active layer, a second cladding layer, and a saturable absorption layer positioned in at least one of the first and second cladding layers and having an effective band gap which is uniform in a first direction and which becomes smaller from the center to both sides of the saturable absorption layer in a second direction perpendicular to the first direction, to form a stacked semiconductor layer;

an impurity implantation step of implanting ions of an impurity in a portion, having a small effective band gap, of the saturable absorption layer of the stacked semiconductor layer, to form a current constriction layer

which forms a current constriction means for defining a current injection region in the active layer.

43. A method of producing a semiconductor laser according to claim 41, further comprising:

a step of forming, on the substrate, stripe-like masks for selectively forming semiconductor films; and

a step of growing the stacked semiconductor layer after said mask formation step.

44. A method of producing a semiconductor laser according to claim 42, further comprising:

a step of forming, on the substrate, stripe-like masks for selectively forming semiconductor films; and

a step of growing the stacked semiconductor layer after said mask formation step.

45. A method of producing a semiconductor laser according to claim 41, further comprising:

a step of disposing stripe-like masks for selectively forming semiconductor films on the substrate or at positions opposed to the substrate; and

a step of growing the stacked semiconductor layer through the masks.

46. A method of producing a semiconductor laser according to claim 42, further comprising:

a step of disposing stripe-like masks for

selectively forming semiconductor films on the substrate or at positions opposed to the substrate; and

a step of growing the stacked semiconductor layer through the masks.